View metadata, citation and similar papers at core.ac.uk
brought to you by CORE
provided by University of Queensland eSpace

CROSSROADS VOLUME V ❖ ISSUE 2: UQ CENTENARY ❖ 2011 ❖ 131–133

IN SHORT

A PARTICULAR QUARTER CENTURY OF AGRICULTURAL SCIENCE AT ST. LUCIA, 1965–1990

Ross Humphreys

The considerable expansion in education and research in agricultural science based in St. Lucia over the period 1965–1990 is described. The evolution of staff and infrastructure which widened to the scope of agricultural science, both in Australia and overseas, led to many research outcomes which are selectively mentioned.

INTRODUCTION

Agricultural science deals with the interaction of plant, soil, and animal systems and how farmers and social policies manipulate these interactions towards desirable outcomes. In 1965 the scope and depth of these interactions were limited by the small size of the academic group at the St. Lucia campus of The University of Queensland, where eight academics taught soil science, chemistry, agricultural economics and agricultural extension, and by the focus on agricultural technology at the Queensland Agricultural College and High School, where the undergraduates spent their third year.

Graeme L. Wilson has described how, with the assistance of the Institute of Agricultural Science, the recently-appointed Professor of Agriculture, E. J. Britten, was able to take third year teaching to St. Lucia to commence an era of expansion of agricultural science.[1]

A NEW INFRASTRUCTURE

Britten was successful in gaining a further twelve academics by 1972, many of whom were to gain significant international recognition in their disciplines: Colin Asher and David Edwards (plant nutrition), Don Byth (quantitative genetics), Graeme Wilson (crop physiology), Peter Whiteman (pasture agronomy), John Longworth (economics), and Clive Bell (soil science). These not only raised the standard of undergraduate teaching but provided the foundations for a strong school of postgraduate research education which attracted overseas students. The curriculum was modified to follow basic science in first year with an introduction to the range of disciplines of agricultural science, and increasing specialisation in the final two years.

1. G. L. Wilson, *Chronicle of the Department of Agriculture: the University of Queensland 1947–1997* (St. Lucia: Department of Agriculture, The University of Queensland, 1997).

Professor Emeritus **L. ROSS HUMPHREYS** *is an Honorary Research Consultant in the School of Land, Crop and Food Sciences at The University of Queensland.*

Crossroads ISSN 1833-878X.

When Britten arrived from Hawai'i, Agriculture occupied the basement of the Goddard Biological Sciences Building. James Birrell won a prestigious architectural award for the Hartley Teakle building, despite the flow of road run-off into level two of the structure. It was occupied by Agriculture and Entomology in 1969. A glasshouse complex and controlled environmental facilities were conveniently located to the west. The UQ farm at Redland Bay was expanded by purchase, and the Tooth Bequest also provided funds for 100 hectares of land at Mt. Cotton for studies in animal and pasture science; Sir Stanley Colman of Australian Estates donated a laboratory. As the computing and laboratory facilities were gradually strengthened, the infrastructure Britten initiated formed a comprehensive base for wider undergraduate courses and a serious research school which emphasised tropical and subtropical agriculture.

Educational and Research Outcomes

Agriculture was an early department to commit to the globalization of UQ. Britten stimulated an involvement in the Australian Asian Universities Cooperation Scheme in Indonesia. Graeme Wilson became Head of Department from 1973 and I was elected from 1978 to 1991. We started a long series of initiatives in Thailand: the Khon Khen Pasture Improvement Project, the Thai Australian Highlands Agricultural Project, and the Thai Australian Prince of Songkhla University Project, which transformed their Faculty of Natural Resources. Part of our philosophy was to involve UQ academics in the overseas situation, so that the projects undertaken by the research students had relevance to their local conditions, and we then provided seeding grants for their research when they returned. The students would use their research in their teaching, achieving a regional relevance. Don Byth developed effective pulse breeding projects in India and elsewhere, while one of Peter Whiteman's projects fostered pasture improvement in the Solomon Islands. Numerous projects were developed with the Australian Centre for International Agricultural Research. By 1992 external research funds annually exceeded $3,000,000. Some students entered postgraduate course work programmes, and from the 1980s there were usually about 100 postgraduate students from twenty-five countries working in the Department, and at least an equal number of Australian research students; for many years Agriculture (with Psychology) had more research students than any other department at UQ.

In my monograph I selectively describe some outstanding research outcomes,[2] and there follow a still more selective set of highlights. In the social sciences, John Longworth advanced farm management as an integrative paradigm, using a computer-based dynamic decision-making exercise which was widely used in other Australian universities. The Department had long been a leader in national workshop programmes in agricultural extension.

Plant improvement was always a strong focus in the Department, and as a quantitative geneticist Don Byth was aided by Kaye Basford's understanding of pattern analysis, which dealt with the clustering and ordination procedures appropriate for the data from Byth's group. She was particularly successful with three-way pattern analysis which led to more efficient decision-making by plant breeders and faster outcomes in the release of new varieties. These and other mathematical advances were widely adopted in the improvement of pulses, oilseeds, and the major cereals. Inputs from crop physiology, led by Graeme Wilson, were seminal for the geneticists. Max Shelton's improvement of the shrub legume *Leucaena*, allied with a strong educational programme for graziers, exemplifies a research initiative which benefits both farmer income and provides environmental protection. The superior growth of cattle grazing *Leucaena*-grass pastures has other positive outcomes: soil nitrogen accretion, carbon sequestration, and reduced soil erosion and salinity.

2. L. Ross Humphreys, *Agricultural Science at UQ: a Centenary Celebration* (St. Lucia: School of Land, Crop and Food Science, The University of Queensland, 2010).

Mine rehabilitation is another example of the department's achievement in hard science, environmental protection and social change. Clive Bell impacted directly in changing the culture of the mining industry, brought several million dollars of research and scholarship funds to the department, became involved in many international programmes, and educated a whole cadre of scientists whose subsequent employment dominated this field. Perhaps the first step was to stockpile topsoil for future regeneration, but there were many changes related to the characters of the spoil: sodicity, salinity, heavy metal toxicity, and erodibility.

Soil acidity was often associated with aluminium toxicity, and in this Bell and his students were linked with Colin Asher and David Edwards in defining aluminium speciation and the bonding of aluminium in organic complexes. These gave variable responses in plant growth, reflected in the interaction of aluminium with the pectin in the cell wall, the control cell of elongation, and the damage to root hairs affecting the capacity of the legumes to form nodules.

In animal science, Barry Norton's discovery of cobalt deficiency in sheep, and later cattle, was significant for Queensland. The studies of protein metabolism differentiated condensed tannins according to their binding capacity and their level of astringency. The contribution of by-pass protein which avoided degradation in the rumen led to new approaches in plant improvement and the construction of animal feeding systems.

Conclusion

In 1990 UQ absorbed the Queensland Agricultural College at Gatton, and this diluted science with agricultural technology. Food Science moved to St. Lucia in the new School of Land, Crop and Food Sciences; the laboratories of the Hartley Teakle building were expanded, but the farms at Redland Bay and Mt. Cotton were sold. Research education at St. Lucia continued, but recruitment to agricultural science decreased.

Exposure to reductionist science, which seeks to unravel in quantitative terms the processes operating in biological and physical systems continued. While universities inevitably teach a good deal of received wisdom about the current state of knowledge, our agricultural science graduates are aware of its partial character. Some seek to recognise the unexpected patterns which emerge in research data to suggest imaginative leaps which lead to new understandings. At a rather lower level of the creative process, problem solving is the dominant paradigm of education in agricultural science, but its effectiveness relies on strong interactions between farmers and scientists in local and global situations. A growth in research and educational outcomes in agricultural science at St. Lucia was especially evident in the quarter-century 1965–1990.